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(54) Voice response toy

(57) A voice response toy consists of a base 10, a rod 15 disposed on the base 10, a fluctuating member 16 disposed on the base separately from the rod by means of a damper 18, a damper 17 connecting the rod 15 to the fluctuating member 16; a microphone (not shown) disposed inside the base, a drive means for rotating the rod when a voice or other external acoustic signal is received at the microphone, and a controlling circuit for the microphone and drive means. The fluctuating member is thus caused to perform a complex and interesting motion.

Figure 1

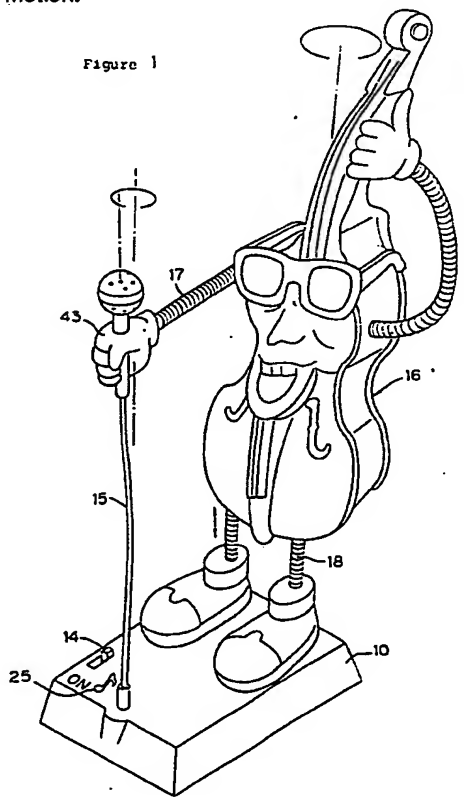

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Figure 1

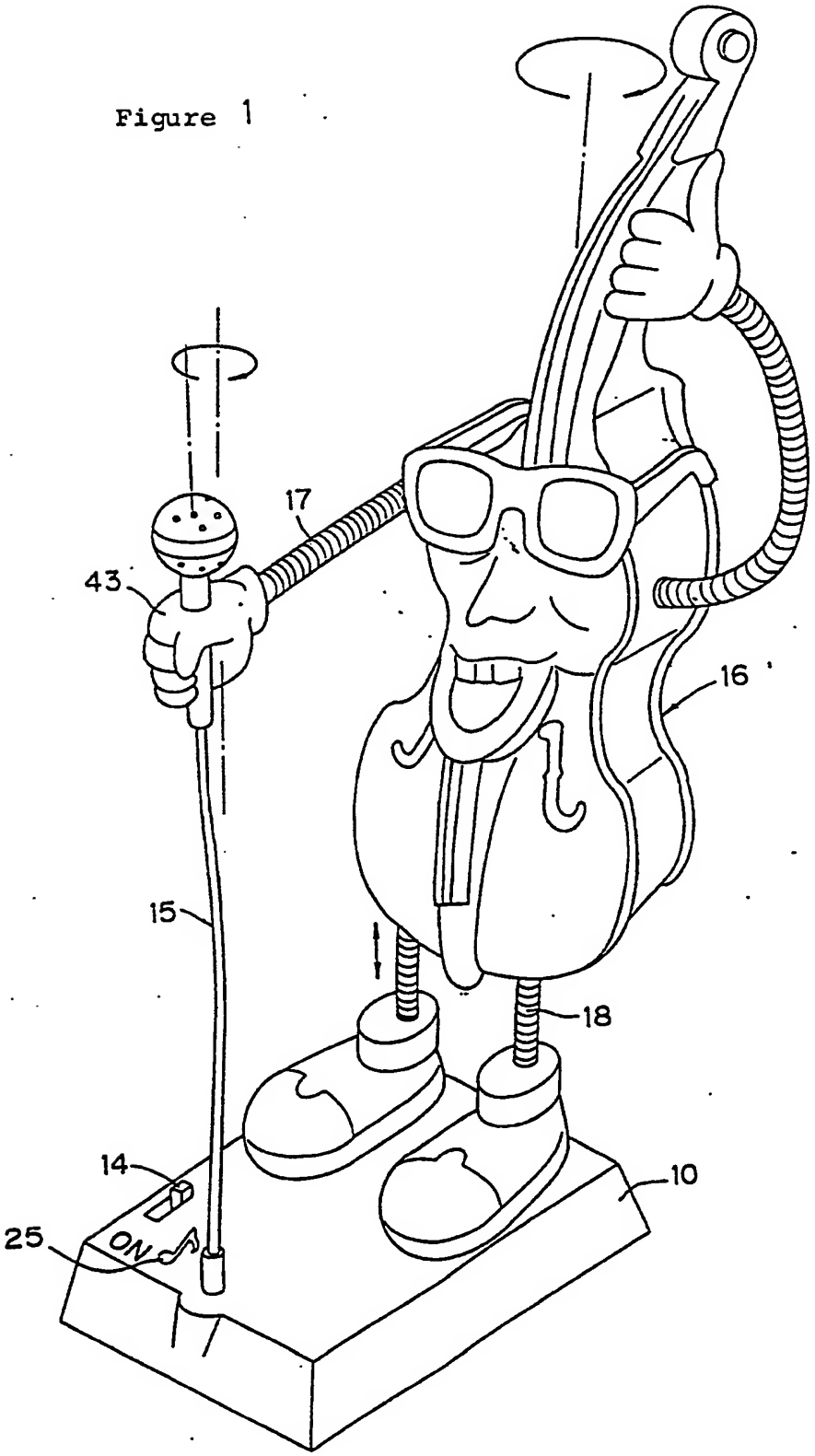


Figure 2

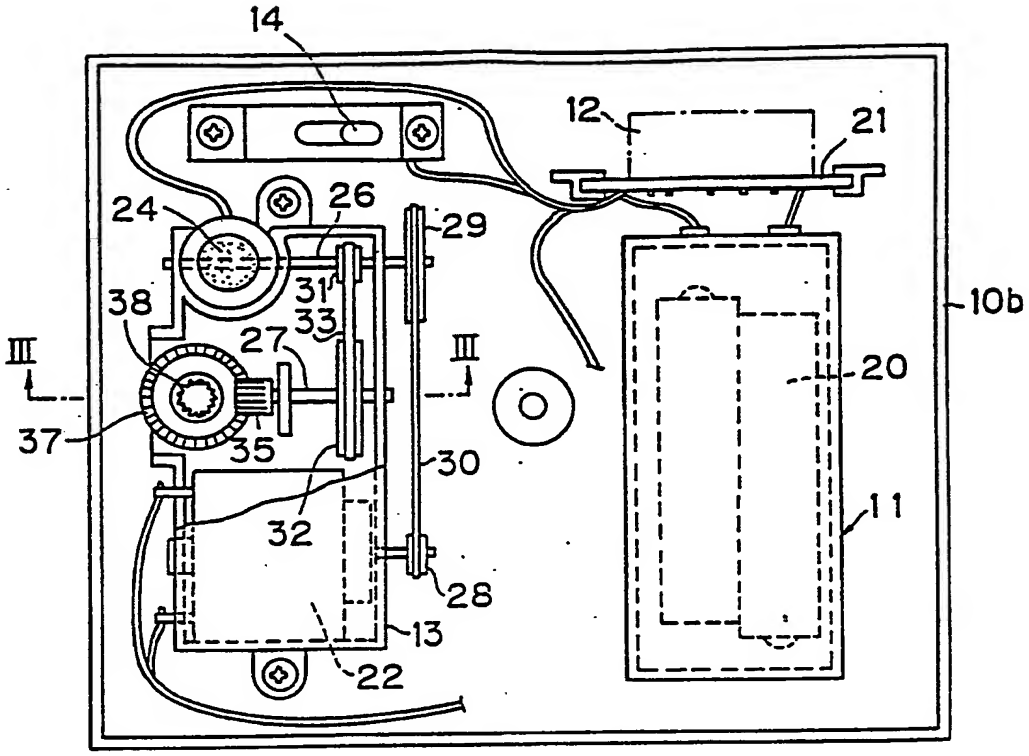


Figure 3

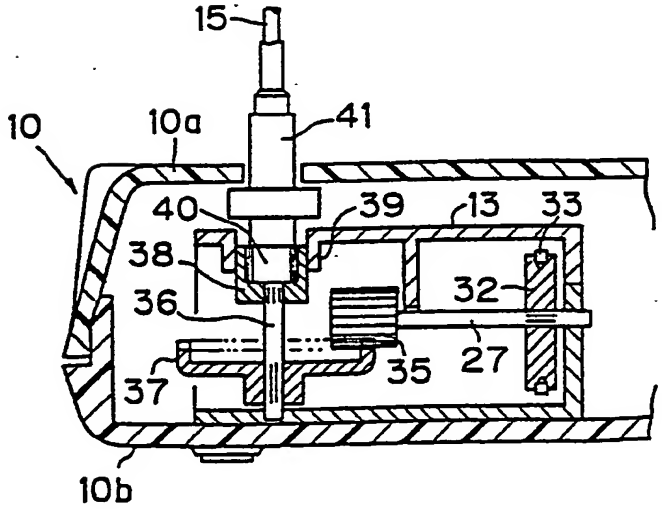


Figure 4

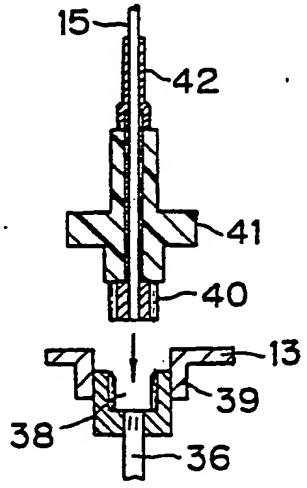
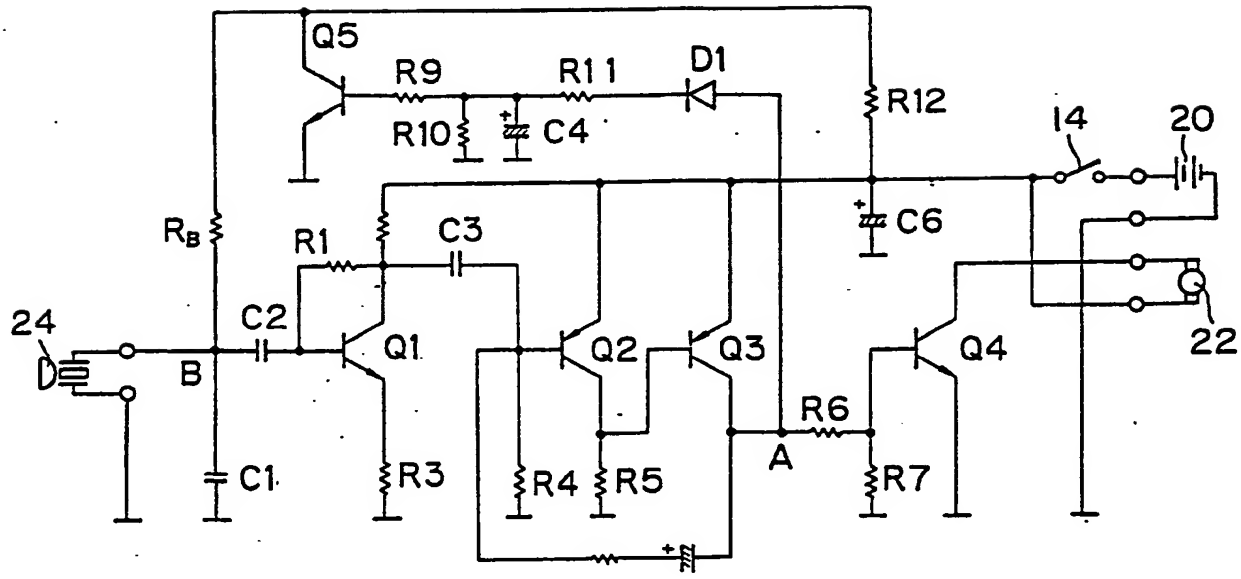


Figure 5


Q5
R9
R11
D1
R12
R10
C4
14
20
R_B
R1
C3
C6
24
C2
Q1
Q2
Q3
Q4
22
B
R6
A
C1
R3
R4
R5
R7

VOICE RESPONSE TOY

This invention relates to a voice response toy in which a fluctuating member is actuated by a voice or other external acoustic signal.

Toys are known in which an electric motor is actuated by receiving a voice or other external acoustic signal through a microphone to permit a movable member to move in some manner through rotating and fluctuating mechanisms. Recently a toy has appeared in which component parts of an imitation flower, for example a stem, flowers or leaves, are driven to torsional oscillation by a voice actuated motor.

In this toy, on detection of a signal from the microphone, the motor is activated and rotates a rod through a series of reducing gears. This rod is at the centre of the plant stem. The rod is pre-twisted so that features of the toy will move when the rod is rotated by the motor. The motion of the features is driven directly by the motion of the rod and is thus relatively simple.

The microphone may also detect mechanical noises caused by the gear mechanism during operation. As a result of this, the battery is rapidly consumed when the switch is left ON, since a motor is continuously driven even if voice or sound is no longer actuated by the microphone.

An object of the present invention is to provide an improved voice response toy which has a more interesting motion.

An object of a preferred embodiment of the present invention is to provide a voice response toy which prevents mechanical noise of a drive means driving a motor except when a voice or sound is input.

Accordingly, the present invention provides a voice response toy comprising a base, a rod disposed on the base, a fluctuating member disposed on the base separately from the rod, the fluctuating member being connected to the base via a damper and a damper also connecting the rod with the fluctuating member, a microphone disposed inside the base, a drive means for rotating the rod when a voice or other external acoustic input signal is received at the microphone to actuate the fluctuating member, and a controlling means.

Preferably, the drive means comprises an electric motor, a belt type double reduction transmitting mechanism, a crown gear disposed at the end of the double reduction transmitting mechanism, and a coupling disposed inside of the crown gear, to which the lower end of the rod is engaged. Further the controlling means may comprise a wave forming circuit for the sound input signal from the microphone, an amplifier circuit, and a charge and discharge circuit simultaneously charged with inputting a voice signal and breaking the voice input signal by the discharge thereof.

In this voice response toy, when a sound input signal is processed in a controlling circuit to drive a drive means, a rod on the base is rotated to fluctuate a fluctuating member connected thereto through a damper. By a function of a charge and discharge circuit in the controlling circuit, even if the

voice input signal is continuously input, an electric current toward a motor is interrupted temporarily for a time determined by a time constant of the charge and discharge circuit, and so to the fluctuating member is transmitted a complex motion by applying again the electric current after discharged.

A preferred embodiment of the present invention will be described in detail, by example only, with reference to the accompanying drawings, in which

Fig. 1 is a perspective view of a voice response toy of the present invention;

Fig. 2 is a plan view of the inside of a base thereof;

Fig. 3 illustrates the assembly to drive the motion of the rod;

Fig. 4 illustrate the mounting of the rod in the rotating assembly; and

Fig. 5 shown an example of the electronic control circuit described.

Referring to Figs. 1 and 2, the house 10 consists of an upper half portion 10a and a lower half portion 10b, a battery containing chamber 11, a controlling element 12, a box 13 which contains driving mechanisms and a switch 14. A rod 15 and a fluctuating member 16 are respectively attached to opposite side of the upper face of the upper half of the base 10a. The moving body 16 moves in imitation of the musical instrument, the doll, the animal or other object which it is designed to resemble.

The upper part of the moving body 16 is connected to the rod 15 by a damper 17 and the lower part thereof is elastically supported on the base 10 by damper 18. These dampers may be

coil springs, leaf springs or other substantially damped resilient members.

A battery 20 is located in the battery container chamber 11. The controlling element 12 is provided on a printed circuit board 21 inserted in to the foot protruding from the upper surface of the lower half portion 10b of the base.

A motor 22 is located at one side of the drive mechanism box 13 and at the other side thereof there is a microphone 24. The microphone 24 is located just below an aperture in the upper half section of the base 10a through which external sounds may pass.

The first and second horizontal shafts 26, 27 are laid over the box 13 and form part of a belt type double reduction transmitting member. The first belt 30 is run between a pulley 28 at the output shaft for the motor 22 and a pulley 29 at the end of the first horizontal shaft 26 while the second belt 33 is run between a pulley 31 mounted on shaft 26 within the box 13 and a pulley 32 mounted as the second horizontal shaft 27.

At the other end of the horizontal shaft 27, as shown in Fig. 3, a pinion 35 is provided to engage with a crown gear 37 on which a shaft 36 is mounted vertically. At the upper end of the shaft 36, an inner gear type coupler 38 is fixed. The coupler 38 is inserted into a guide 39 protruded downwards from the upper wall of the box B. As shown in Fig. 4, a coupler 38 is designed to receive a gear 40 fixed to the lower end of the rod 15.

The rod 15 is covered with a tube 42 having a retainer 41 at the lower end. At the upper end of tube 42 as shown in Fig.

1, a gripping portion 42 holds the damper 17 which connects the rod 15 to the fluctuating member 16.

After the switch 14 is moved to ON, the voice signal transmitted to the microphone 24 may be processed by the controlling circuit 12 to drive the motor 22. The pinion 35 provided to the second horizontal shaft 27 is rotated through a double reduction mechanism composed of the belt and the pulley by driving the motor to rotate the rod 15 through the crown gear 37, the shaft 36, the coupler 38 and the gear 40.

The rod 15, as shown in Fig. 1, is slightly curved upwardly from the foot portion so that, as indicated by an arrow, the upper end thereof describes a circular motion. This circular motion is transmitted to the fluctuating member 16 through the damper 17 to cause overall fluctuating motion in combination with a slight vertical motion from the action of dampers 17 and 18. While the rod 15 is driven, the rotation of the motor is transmitted by the belt type reduction mechanism so as to eliminate a noise, and mechanical noise caused by the transmission may not provide signals at the microphone 24 which will activate the motion.

Fig. 5 shows an example of such a controlling circuit.

The signal transmitted from the microphone 24 is shaped by a circuit including transistor Q_1, Q_2 and Q_3, and amplified by a transistor Q_4 to drive the motor 22.

While the motor 22 is driven, the voltage level at the point A after the wave shaping step is input through the diode D_1 to the charge and discharge circuit C_4 and R_{11}. Capacitator C4 is charged at the same time as an acoustic signal is

received. By a discharge after a time (CR) the transistor Q_5 is driven to conduction allowing the terminal voltage of the resistor R_B to fall to 0 so that the microphone is prevented from giving any signal and the driving of the motor is stopped. When transistor Q_5 becomes non-conductive after the discharge has finished, there is a voltage across the resistor R_B, so the signal received in the microphone may be wave shaped and amplified to activate the motor again. By repeating the above process the rod is intermittently rotated to provide a complex motion to the fluctuating member 16.

As described, the present invention provides a voice response toy in which a rod disposed on the base rotates and is engaged through the damper to the fluctuating member disposed on the base separately from the rod to transmit a combined circular and vertical motion so that the moving body performs an interesting motion synchronized with the input of a voice or other sound.

The signal input to the microphone may be preserved from disturbance by containing a belt type reduction mechanism in a driving assembly to eliminate mechanical noise. Further the charge and discharge circuit may be contained in a controlling circuit to automatically interrupt the rotation of the motor so that the motion of the fluctuating member becomes more complex and electric consumption is reduced.

CLAIMS

1. A voice response toy comprising a base, a rod disposed on the base, a fluctuating member disposed on the base separately from the rod, the fluctuating member being connected to the base via a damper and a damper also connecting the rod with the fluctuating member, a microphone disposed inside the base, a drive means for rotating the rod when a voice or other external acoustic input signal is received at the microphone to actuate the fluctuating member, and a controlling means.

2. A voice response toy as claimed in claim 1, wherein the driving means comprises an electric motor, a belt type double reduction transmitting mechanism, a crown gear located at the end of the double reduction transmitting mechanism, and a coupling mechanism inside the crown gear, by which the lower end of the rod is engaged.

3. A voice response toy as claimed in claim 1 or 2, wherein the controlling means comprises a wave shaping circuit for the sound input signal from the microphone, an amplifier circuit, and a charge and discharge circuit simultaneously charged during input of an acoustic signal when the discharge thereof breaks the reception of the input signal.

4. A voice response toy substantially as described herein with reference to Figs. 1 to 5 of the accompanying drawings.

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